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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/691,452	10/22/2003	Michael J. Kardauskas	SR.US.1	7331

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EXAMINER

FICK, ANTHONY D

ART UNIT	PAPER NUMBER
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1753

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/691,452

Applicant(s)

KARDAUSKAS ET AL.

Examiner

Anthony Fick

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 3/3/04 5/14/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 8 through 10, 13, 15 through 20, 30 through 33 and 39 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 11-266031.

JP '031 shows a diffraction surface used for concentrating light onto solar cells as seen in figures 1 and 17.

Regarding claim 1, figure 16 shows the structure containing a substrate with a diffractive surface, 18, a coating layer having an index of refraction different from the substrate, 17, the diffractive surface having a relief pattern to diffract incident radiation in at least two directions (see figure 1).

Regarding claims 8 and 9, JP '031 discloses the substrate is a plastic film and the coating layer is aluminum (paragraph 0039, English translation).

Regarding claims 10 and 13, figure 16 shows an insulation layer, 19, over the coating layer that is plastic, a polymer (paragraph 0039).

Regarding claim 15, figures 1 and 16 show a transparent cover plate, 5, having a top surface disposed toward incoming radiation and a bottom surface overlying the coating layer, with the diffracted radiation being redirected toward the top surface of the transparent cover and internally reflected (see figure 1).

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Regarding claim 16, JP '031 discloses a support structure having a planar surface, 28, a plurality of solar cells overlying the planar surface, 6, a transparent cover member, 5 or 22, and a diffractive optical member redirecting radiation toward the solar cells (see figures 1, 19, 20).

Regarding claim 17, figure 16 shows the structure containing a substrate with a diffractive surface, 18, a coating layer having an index of refraction different from the substrate, 17, the diffractive surface having a relief pattern to diffract incident radiation in at least two directions (see figure 1).

Regarding claim 18, figure 16 shows the embossing is less than the thickness of the substrate.

Regarding claim 19, JP '031 discloses the repeated pitch having lateral dimensions of 10 or less times the wavelength of light, thus the range includes less than 4000 nanometers.

Regarding claim 20, figure 1 shows the diffractive pattern extends to cover spaces between the solar cells.

Regarding claims 30, 31 and 32, JP '031 discloses the substrate is a plastic film and the coating layer is aluminum (paragraph 0039, English translation).

Regarding claim 33, figure 16 shows an insulation layer, 19, over the coating layer that is plastic, a polymer (paragraph 0039).

Regarding claim 39, figure 16 shows the use of an adhesive material bonded to the cover member and support structure.

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3. Claims 1, 3, 7, 15, 16, 17, 20, 25, 29 and 39 are rejected under 35 U.S.C. 102(b) as being anticipated by Rosenberg (U.S. 6,274,860).

Rosenberg discloses a device for concentrating optical radiation by using a holographic planar concentrator as shown in figure 10.

Regarding claim 1, the structure comprises a highly transparent plate with a coating layer of multiplexed holographic optical film, a film with diffractive structures on the surface to diffract incident radiation into one or more diffraction orders and redirect incident radiation in at least two directions (see figure 10).

Regarding claims 3 and 7, the holographic film has a diffractive optical element, a hologram (abstract).

Regarding claim 15, figure 10 shows a transparent cover plate, 12, such that the diffracted radiation is internally reflected.

Regarding claims 16 and 20, figure 10 also shows a plurality of solar cells being spaced from one another, 30, a transparent cover member overlying and spaced from the solar cells, 12, and a diffractive optical member overlying areas between the solar cells to redirect radiation toward the solar cells.

Regarding claim 17, the structure comprises a highly transparent plate with a coating layer of multiplexed holographic optical film, a film with diffractive structures on the surface to diffract incident radiation into one or more diffraction orders and redirect incident radiation in at least two directions (see figure 10).

Regarding claims 25 and 29, the holographic film has a diffractive optical element, a hologram (abstract).

Regarding claim 39, Rosenberg discloses encasing the photovoltaic system with an EVA adhesive, a light transmissive polymer material, that bonds the cover member to the support structure and the diffractive optical member (Example 1, column 15).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2 through 7 and 21 through 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '031 as applied to claims 1, 8 through 10, 13, 15 through 20, 30 through 33 and 39 above, and further in view of Fleming et al. (Blazed diffractive optics, Applied Optics, Vol. 36, No. 20, 1997, pgs 4635-4643).

The disclosure of JP '031 is as stated above for claims 1, 8 through 10, 13, 15 through 20, 30 through 33 and 39.

The differences between JP '031 and the claims are the requirements of specific diffractive surfaces and diffracted directions.

Fleming et al. teach a variety of diffractive elements and methods of making. The elements include diffraction grooves and diffractive optical elements such as binary, multilevel, kinoform and hologram.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the variety of different diffractive elements as in Fleming et al. as the diffractive surface of JP '031 because the different types are functional

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equivalents that Fleming et al. shows are known in the art at the time of the invention. Absent any unexpected results it would be obvious to choose a specific type. Further, the choice of diffracted directions is dependent on the type of diffraction surface and specific application. It would have been further obvious to one having ordinary skill in the art at the time the invention was made to choose the specific amount of directions and the angle between the directions. Because Fleming et al. and JP '031 are concerned with diffractive elements, one would have a reasonable expectation of success from the combination. Thus the combination meets the claims.

6. Claims 2, 4, 5, 6, 21 through 24, 26, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosenberg as applied to claims 1, 3, 7, 15, 16, 17, 20, 25, 29 and 39 above, and further in view of Fleming et al. (Blazed diffractive optics, Applied Optics, Vol. 36, No. 20, 1997, pgs 4635-4643).

The disclosure of Rosenberg is as stated above for claims 1, 3, 7, 15, 16, 17, 20, 25, 29 and 39.

The differences between Rosenberg and the claims are the requirements of specific diffractive surfaces and diffracted directions.

Fleming et al. teach a variety of diffractive elements and methods of making. The elements include diffraction grooves and diffractive optical elements such as binary, multilevel, kinoform and hologram.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the variety of different diffractive elements as in Fleming et al. as the diffractive surface of Rosenberg because the different types are functional

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equivalents that Fleming et al. shows are known in the art at the time of the invention. Absent any unexpected results it would be obvious to choose a specific type. Further, the choice of diffracted directions is dependent on the type of diffraction surface and specific application. It would have been further obvious to one having ordinary skill in the art at the time the invention was made to choose the specific amount of directions and the angle between the directions. Because Fleming et al. and Rosenberg are concerned with diffractive elements, one would have a reasonable expectation of success from the combination. Thus the combination meets the claims.

7. Claims 11, 12, 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '031 as applied to claims 1, 8 through 10, 13, 15 through 20, 30 through 33 and 39 above, and further in view of Tuttle et al. (U.S.P.G.Pub 2005/0074915).

The disclosure of JP '031 is as stated above for claims 1, 8 through 10, 13, 15 through 20, 30 through 33 and 39.

The difference between JP '031 and the claims is the requirement of a specific insulation layer.

Tuttle teaches a thin film solar cell as shown in figure 3. The solar cell is insulated from a metal layer by the use of silicon oxide or aluminum oxide (paragraph 0023).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize silicon oxide or aluminum oxide as in Tuttle for the insulation layer of JP '031 because the materials are known insulators for preventing the

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shorting of solar cells with a metal film layer as shown by Tuttle. Because Tuttle and JP '031 are both concerned with solar cells, one would have a reasonable expectation of success from the combination. Thus the combination meets the claims.

8. Claims 14 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '031 as applied to claims 1, 8 through 10, 13, 15 through 20, 30 through 33 and 39 above, and further in view of Taketoshi et al. (U.S. 4,451,241).

The disclosure of JP '031 is as stated above for claims 1, 8 through 10, 13, 15 through 20, 30 through 33 and 39.

The difference between JP '031 and the claims is the requirement of a specific insulation layer.

Taketoshi teaches the use of insulation material such as silicon oxide of magnesium fluoride on a metal layer (column 5, paragraph 3).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize magnesium fluoride as in Taketoshi for the insulation layer of JP '031 because it is a known insulator to protect metal layers. Absent any unexpected results, it would be obvious to choose the specific insulator such as magnesium fluoride.

9. Claims 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '031 as applied to claims 1, 8 through 10, 13, 15 through 20, 30 through 33 and 39 above, and further in view of Takada et al. (U.S.P.G.Pub 2002/0063962).

The disclosure of JP '031 is as stated above for claims 1, 8 through 10, 13, 15 through 20, 30 through 33 and 39.

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The difference between JP '031 and the claims is the requirement of a specific coating layer.

Takada teaches the use of dielectric coatings on diffractive optical elements to provide improved first order reflectance, including multilayer dielectric coatings (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the dielectric coatings of Takada as the coating layer of JP '031 because the dielectric coatings improve the wavelength selectivity of the diffraction grating and can also improve the polarization selectivity (Takada paragraph 0009). Because Takada and JP '031 are both concerned with diffractive surfaces, one would have a reasonable expectation of success from the combination. Thus the combination meets the claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Fick whose telephone number is (571) 272-6393. The examiner can normally be reached on Monday thru Friday 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Anthony Fick *ADF*
AU 1753
March 16, 2007


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